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# Communist China's Advanced Weapons Program

Submitted by the  
DIRECTOR OF CENTRAL INTELLIGENCE  
Concurred in by the  
UNITED STATES INTELLIGENCE BOARD  
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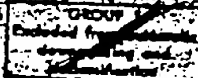
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## COMMUNIST CHINA'S ADVANCED WEAPONS PROGRAM

### THE PROBLEM

To assess Communist China's progress toward acquisition of a nuclear weapons and missile capability and to estimate the effects of such a development on Chinese policy.

### NOTE TO READERS

Since our most recent estimate on Communist China's advanced weapons program\* we have received a considerable amount of new information, mainly from photography. This evidence leads us to believe that the Chinese, with Soviet assistance, had embarked in the latter 1950s on a more ambitious advanced weapons program than we had earlier thought likely. We further believe that they are still working on that program though forced to slow its pace materially since 1960. Nevertheless, the gaps in our information remain substantial and we are therefore not able to judge the present state or to project the future development of the Chinese program as a whole with any very high degree of confidence. Specific judgments given below about the stage likely to be reached by the Chinese program at particular dates should be read in the light of this general caution.

### CONCLUSIONS

A. Peiping has given high priority to the development of nuclear weapons and missiles. Recent aerial photography has revealed a number of developmental facilities indicating a broad program which diverts Communist China's limited scientific and technological resources from other parts of the economy. (*Paras. 2-15 and 19*)

\* NIE 13-2-62, "Chinese Communist Advanced Weapons Capabilities," dated 25 April 1962. (TOP SECRET)

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B. We have found what we believe to be a plutonium production reactor in China, located at Pao-t'ou. This reactor probably could not have reached criticality before early 1962. If it did go critical at that time, the earliest a first device could be tested, based on plutonium from this reactor alone, would be early 1964. If the Chinese run into even a normal number of difficulties, this date would be postponed to late 1964 or 1965. If the reactor reached criticality later than early 1962—or has not yet done so—the detonation would be even further delayed. Beginning the year after a first detonation the reactor could produce enough material for only one or two crude weapons a year. The Chinese have a few bombers which could carry bulky weapons of early design. (Paras. 4-6 and 17)

C. We believe that the eventual Chinese program calls for nuclear weapons containing both U-235 and plutonium. Such a program would require more plutonium production facilities than the one reactor that has been identified. Neither photographic coverage nor other significant evidence have disclosed another production reactor in China. The possible existence of another reactor cannot be ignored however, nor the possibility that one may be in production. We therefore cannot exclude the possibility that the Chinese could achieve a first detonation at any time. (Para. 7)

D. The gaseous diffusion plant at Lanchou will probably not be able, under the most advantageous circumstances, to produce weapon-grade U-235 before 1966. Considering the great technical difficulties involved and the large amount of additional construction needed, a more likely date for such production is 1968-1969. (Paras. 2 and 3)

E. Peiping is probably concentrating initially on a medium-range ballistic missile (MRBM) system of basically Soviet design, either the 630 mile SS-3 or the 1,020 mile SS-4. We do not believe that missiles would be ready for deployment before 1967. Because of the time and difficulties involved in producing a missile-compatible warhead, we believe China is not likely to develop such a warhead until 3 or 4 years after a first detonation. (Paras. 16 and 18)

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F. The detonation of a nuclear device would boost domestic morale. Although it is possible that the leadership would experience a dangerous degree of overconfidence, we think it more likely that Peiping will concentrate on furthering its established policies to: (1) force its way into world disarmament discussions and other world councils; (2) overawe its neighbors and soften them for Peiping-directed Communist subversion; and (3) tout Chinese-style communism as the best route for an underdeveloped nation to achieve industrial and scientific modernity. In pursuing its policies, Peiping's increased confidence would doubtless be reflected in its approach to conflicts on its periphery.\* (Paras. 20-27)

\* "The Acting Director, Bureau of Intelligence and Research, Department of State, believes that China's leaders would recognize their limited capabilities had not altered the real power balance among the major states and could not do so in the future. In particular, they would recognize that they remained unable either to remove or neutralize the US presence in Asia and would not become willing to take significantly greater military risks."

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## DISCUSSION

### I. PROSPECTS FOR COMMUNIST CHINA'S ADVANCED WEAPONS PROGRAM

#### A. The Nuclear Program

1. Soviet assistance was an important factor in the Chinese nuclear program until 1959, ranging from participation in uranium prospecting and processing through the supply of a research reactor and cyclotron to assistance in constructing a major facility for the separation of U-235. Strains in Sino-Soviet relations, however, disrupted this program and by mid-1960 we believe the Soviets had stopped providing technology and equipment for China's nuclear program and had withdrawn Soviet nuclear technicians. These blows have greatly retarded the Chinese nuclear program. The Soviets could not, however, undo what had already been done, and construction of the gaseous diffusion plant at Lanchou, for example, was already well under way.

#### *The Gaseous Diffusion Plant*

2. This gaseous diffusion plant is similar to such plants in the USSR. Photography of September 1959 shows that the exterior of the present main building was largely completed by that time, but the facility lacked a power supply. Photography of March and June 1963 shows that the nearby hydroelectric plant, which was apparently designed to supply the diffusion plant, has made some progress, but much work remains to be done. In the meantime, some power is available. Two transmission lines, one of which appears to be complete, connect the diffusion plant with a thermal electric plant at Lanchou. A substation has been built at the diffusion plant, and installation of transformers alongside the main building has begun, though only two of a probable 38 were shown in place in the latest photography.

3. The building at Lanchou is big enough to permit the production of low enrichment U-235, suitable for use in reactors. However, at least twice as much floor area as that provided by the present main building would be required to produce weapon-grade U-235. There is an adjacent area inside the security fence apparently intended for such expansion, and there is some sign that work may be beginning there. Even if work is under way and all of the highly specialized separation equipment was promptly available, the earliest date at which weapon-grade U-235 could be produced would be in 1966. Considering the great technical difficulties involved and the large amount of additional construction needed, a more likely date for such production is 1968-1969. It is extremely unlikely that the Chinese have developed alternative processes for quantity production of U-235.

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*The Plutonium Production Reactor*

4. Recent photographic coverage of the Pao-t'ou area of Inner Mongolia has revealed an installation with elaborate security arrangements. This installation includes what we believe to be a small air-cooled plutonium production reactor, of about 30 megawatts capacity, with associated facilities for chemical separation and metal fabrication. An air-cooled reactor has the significant advantages of inherent simplicity of design and construction and less stringent purity requirements for the graphite moderator and uranium fuel. We have no knowledge of Soviet work with reactors of this type, but both the United Kingdom and France built such reactors for their initial production of plutonium and considerable unclassified design and operating data on air-cooled reactors has been available since 1955.
5. The chief disadvantage of an air-cooled reactor is its low productivity. The reactor at Pao-t'ou, when in full production, would be able to turn out only enough plutonium for one or, at most, two crude low-yield weapons a year. Peiping may have selected this sort of reactor as the quickest and surest way within its capabilities to achieve a nuclear detonation and acquire at least a token weapons capability. A sizable weapons program based on plutonium alone would require greater quantities of plutonium than can be expected from the Pao-t'ou reactor.
6. We cannot determine from the 1963 photography whether or not the Pao-t'ou reactor is now in operation. If it is in operation, we believe it could not have reached criticality before early 1962. After reaching criticality, one year would be needed for fuel element irradiation within the reactor and an additional 9 to 12 months for cooling of the irradiated fuel, chemical separation of the plutonium and fabrication of a device. Therefore, the earliest a first device could be tested, based on plutonium from this reactor alone is early 1964. However, this schedule assumes that virtually no problems arose in the achievement of reactor criticality or will arise in the operation of the separation and metal fabrication plants or in the fabrication of a nuclear device. Running into even a normal number of difficulties would postpone the date to late 1964 or 1965. If the reactor reached criticality later than early 1962—or has not yet done so—the detonation date would be even further delayed.
7. We believe that the eventual Chinese program calls for nuclear weapons containing both U-235 and plutonium. For such a program, the amount of plutonium which Pao-t'ou could produce would be far too small to be compatible with the amount of weapon-grade U-235 which Lanchou could produce when and if completed. Hence, we believe that the Chinese must at least have planned other plutonium production facilities. We have had photographic coverage of many of the likely areas for reactor sites without identifying another production reactor, and there is no significant collateral evidence indicating the existence

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of such a reactor. Nevertheless, it is possible that there are other plutonium production facilities under construction elsewhere in China or, indeed, that such facilities may be in production. In these circumstances, we cannot exclude the possibility that the Chinese could have a first detonation at any time.

#### B. The Missile Program

##### *The Research and Development Facility*

8. A missile research and development facility was under construction in the spring of 1959 at Chang-hsin-tien, 16 miles southwest of Peiping. Construction appears to have moved ahead at a good pace since then. Its size indicates that the Chinese are aiming at a substantial independent missile program. It now includes three large static test stands with two large assembly/checkout type buildings, and what appears to be a propellants area. Adjacent areas contain ancillary buildings including several buildings suitable for research and development work. The facility appears suitable for developing surface-to-surface ballistic missiles of up to at least MRBM size and is large enough to permit limited production of missiles. Photography indicates that construction is sufficiently far along for the facility to be in at least partial operation.

9. We do not have comparable evidence on the state of the machinery and instrumentation inside the buildings nor on the ability of Chinese industry to supply the necessary materials and components for a missile development program. The electronics industry is the most advanced of China's technical industries and should be the least hard pressed to supply missile components. More difficulties might be expected in providing special alloys for rocket engines, and high-specification non-electronic parts.

##### *The Test Range*

10. The second major element of the missile development program is the complex at Shuang-ch'eng-tzu, which includes a missile range, a major airfield and related facilities. The complex appears to be designed to permit the testing of surface-to-air missiles (SAM) and of surface-to-surface missiles (SSM) up to MRBM distances. Handling facilities and instrumentation at the Shuang-ch'eng-tzu airfield are similar to those used in the USSR for testing air-to-air (AAM) and air-to-surface (ASM) missiles. These facilities suggest that AAM and ASM programs were planned by the Chinese but there is no evidence as to the present status of these programs. The complex was started in early 1958 and by mid-1960 the range was far enough along to permit initial firings for purposes of checking out the missile facilities and range instrumentation and for training Chinese personnel. Construction on the range has been continuing.

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11. We do not know the extent to which the USSR was involved in the development of the Shuang-ch'eng-tzu complex. However, the facilities at the complex generally follow Soviet design. We believe that by mid-1960, when the major withdrawal of Soviet technicians had been accomplished, the Soviets had provided the Chinese with some SA-2s, cruise missiles, and SSMs, possibly up to SS-4s (1,020 n.m.).

12. There is no reliable evidence of flight-test firings of missiles occurring much before late 1961 except for some possible firings of short-range tactical missiles in 1960. We believe some firings occurred in 1962 and 1963 (Photography of June 1962 showing a large crater about 1,500 yards from one of the pads indicates one rather spectacular failure), but the rate of firing can at most have been sporadic and very limited. No evidence of SS ballistic missile deployment has been found.

#### *Defensive Missiles*

13. Sites for coastal defense cruise-type missiles have recently been located at Lien-shan on the Gulf of Liaotung and possibly in an area near Port Arthur. The former may date back to 1959; the latter was still apparently incomplete in May 1963. The missile system at the Lien-shan site is apparently one which the Soviets adapted from their AS-1 missile and which is also being used at Cuban coastal defense missile sites. In March, 1963, there were photographed some 50 crates at Lien-shan which we believe to have contained cruise missiles. Review of earlier photography indicates that at least some of these crates were at Lien-shan in March, 1962. In May, 1963, only 21 crates were photographed. We believe Lien-shan is a training and development area rather than an operational site.

14. Ground photography of February 1963 revealed a probable KOMAR class guided missile patrol boat in Shanghai. KOMARs are equipped with two cruise missiles with an estimated range of 10 to 15 nautical miles and capable of carrying a warhead of 500 to 2,000 pounds of high explosives. We do not know if the Soviets supplied this craft, as they have done for the UAR, Indonesia, and Cuba, or if it is a Chinese-produced version. We have no evidence of a Chinese program to produce KOMARs, but to do so is probably within Chinese capabilities.

15. Communist China has at least 10 SAM sites designed for Soviet SA-2 missiles, not all of which are occupied. We believe that the SAMs now in Chinese hands were supplied earlier by the Soviets. Evidence is scanty but we believe the Chinese are not now producing this type of missile, though they probably plan to produce them in the future.

#### *C. Prospects*

16. About a year after an initial detonation the Chinese could probably produce their first crude weapon and thereafter produce one or two crude

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fission weapons a year. This would be the maximum rate unless and until production from the present Pao-t'ou reactor is supplemented from other facilities. The kind of testing program required to develop a missile warhead would consume most of the fissionable material likely to be available from that reactor for the next several years. Further, there are technical problems involved in achieving the reduced weight and size required. Consequently, we think it unlikely that the Chinese will be able to develop a fission warhead for missiles until three or four years after their first nuclear detonation. This could be even longer if the Chinese have only the Pao-t'ou reactor as a source of plutonium.

17. Even before missiles are available Communist China would have some capability for delivering an early unsophisticated nuclear weapon. It has around 15 TU-4 (BULL) piston driven aircraft with large bomb-bays and a bomb weight capacity of about 20,000 pounds. It has two TU-16 (BADGER) jet medium bombers which, if they are operational, could handle bulky bombs and carry a maximum of about 22,000 pounds. It is not likely that its 315 or so IL-28 (BEAGLE) jet light bombers could handle a bulky, early stage weapon, but they would be usable as more sophisticated weapons were developed.

18. Analysis of existing Chinese facilities and recognition of Peiping's need to concentrate its limited resources lead us to believe that the ballistic missile effort will focus initially upon a medium-range system of either the 1,020 n.m. SS-4 type or the 630 n.m. SS-3 type. The range and the facilities at the rangehead are of a scale which suggests an intention to test missiles of this size. Either of these systems would give the Chinese adequate coverage of peripheral targets. Even if the Chinese concentrate on a single system and give the program continued top priority in scientific and technical resources, we do not believe that the missiles would be ready for deployment before 1967. It is unlikely that a compatible nuclear warhead would be available by that date.

## II. IMPLICATIONS FOR CHINESE POLICY

### A. Domestic Impact

#### *Economic Burden of the Program*

19. China has relatively few top-flight scientists and is generally short of technical talent and deficient in industrial technology. The advanced weapons program has probably been a heavy drain on these limited resources. Only a very small part of this effort would contribute, even indirectly, to the other sectors of an economy as underdeveloped as China's now is. In the meantime, other priority industrial programs in China's troubled economy have lagged. It is probable that at least some difficulties would have been eased had China's limited technical capabilities not been channeled so heavily into the weapons program.

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#### *Rewards of Success*

20. The detonation of a nuclear device and subsequent moves toward acquiring a nuclear weapons capability would be intensively exploited inside Communist China in an effort to raise morale and increase nationalistic fervor. All the many forms of Peiping's pervasive propaganda apparatus would be put to work extolling the virtues of communism and the capabilities of the Chinese people to "progress without outside help." There would surely be a resultant increase in morale, especially among party members, youth, and the educated classes. Probably the mass of the peasantry would be little affected.

21. Although the Chinese Communist leadership might become intoxicated by its own propaganda following a nuclear detonation and adopt unrealistic domestic policies which could do great damage to the economy, it is much more likely that the effect on domestic programs would not be great. The pressing need for agricultural expansion remains so critical that it will almost certainly continue to receive considerable emphasis, as will industries supporting agriculture. However, the Chinese leaders will almost certainly continue to devote substantial effort to the development and production of advanced weapons, even though the cost of such programs may rise at a faster rate than overall economic growth.

#### *B. Military Policy*

22. Chinese Communist propaganda has generally played down the importance of nuclear weapons in war. The Soviet Union did likewise in the late 1940s, before it had nuclear weapons. This, of course, changed drastically after the USSR became a nuclear power. After Peiping has achieved a detonation and is on its way to getting weapons, it too may change its public attitude on their importance. This slowly developing capability will increase Communist China's already considerable military advantage over its Asian neighbors. However, even if it completes the program we believe was contemplated in the late 1950s, for the foreseeable future Communist China will not approach the advanced weapons might of the US or USSR, particularly in the field of long-range striking power. For this reason, among others, Peiping would be unlikely to attribute a decisive importance to modern weaponry. The regime would probably still rely primarily on its huge ground force and, unless confident of Soviet support, would try to avoid hostilities which might escalate into nuclear war. Considering the chances of retaliation, it is difficult to conceive of any situation in which Peiping would be likely to initiate the use of nuclear weapons in the next decade or so.

#### *C. Foreign Policy*

23. Peiping will be sure to exploit its achievements to the hilt in its extensive propaganda. It will probably try to confuse the distinction

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between a simple detonation and a weapons capability and between having a small weapons capability and being a major nuclear power. Also the Chinese might well use a prototype MRBM, with one or more additional stages, to place a satellite into orbit. This could be accomplished some time before an MRBM was operable and well before such a system was nuclear armed. The purpose, of course, would be to give the impression of much greater strength than had actually been acquired and to persuade the people of neighboring countries that Peiping was riding the wave of the future which it was futile to resist. At the same time Peiping would work to persuade audiences in other underdeveloped countries that Chinese-style communism provides the most effective and rapid way to become a modern industrial, scientific, and military power.

24. A Chinese Communist nuclear detonation would increase the momentum of Peiping's drive for great-power status and acceptance in international councils. Peiping would argue that it is less dangerous to have a nation with nuclear arms in the UN and other international bodies than to keep it isolated, and would be in a position to claim persuasively that substantial progress toward world peace and disarmament was seriously hampered unless it participated in negotiations. Peiping has already gone on record as not being bound by any agreements made without its participation. It would demand international recognition, UN membership, or other prerequisites as the price of its participation. In any event, Communist China would reject a comprehensive nuclear test ban treaty.

25. We do not believe that the explosion of a first device, or even the acquisition of a limited nuclear weapons capability, would produce major changes in Communist China's foreign policy in the sense that the Chinese would adopt a general policy of open military aggression, or even become willing to take significantly greater military risks. China's leaders would recognize that their limited capabilities had not altered the real power balance among the major states and could not do so in the foreseeable future. In particular, they would recognize that they remained unable either to remove or neutralize the US presence in Asia.

26. Nevertheless, the Chinese would feel very much stronger and this mood would doubtless be reflected in their approach to conflicts on their periphery. They would probably feel that the US would be more reluctant to intervene on the Asian mainland and thus the tone of Chinese policy would probably become more assertive.\* Further, their

\* "The Acting Director, Bureau of Intelligence and Research, Department of State, feels that the first two sentences of this paragraph are inconsistent with paragraph 25 and that there is insufficient evidence to warrant such a definite statement about the Chinese appraisal of our intentions."

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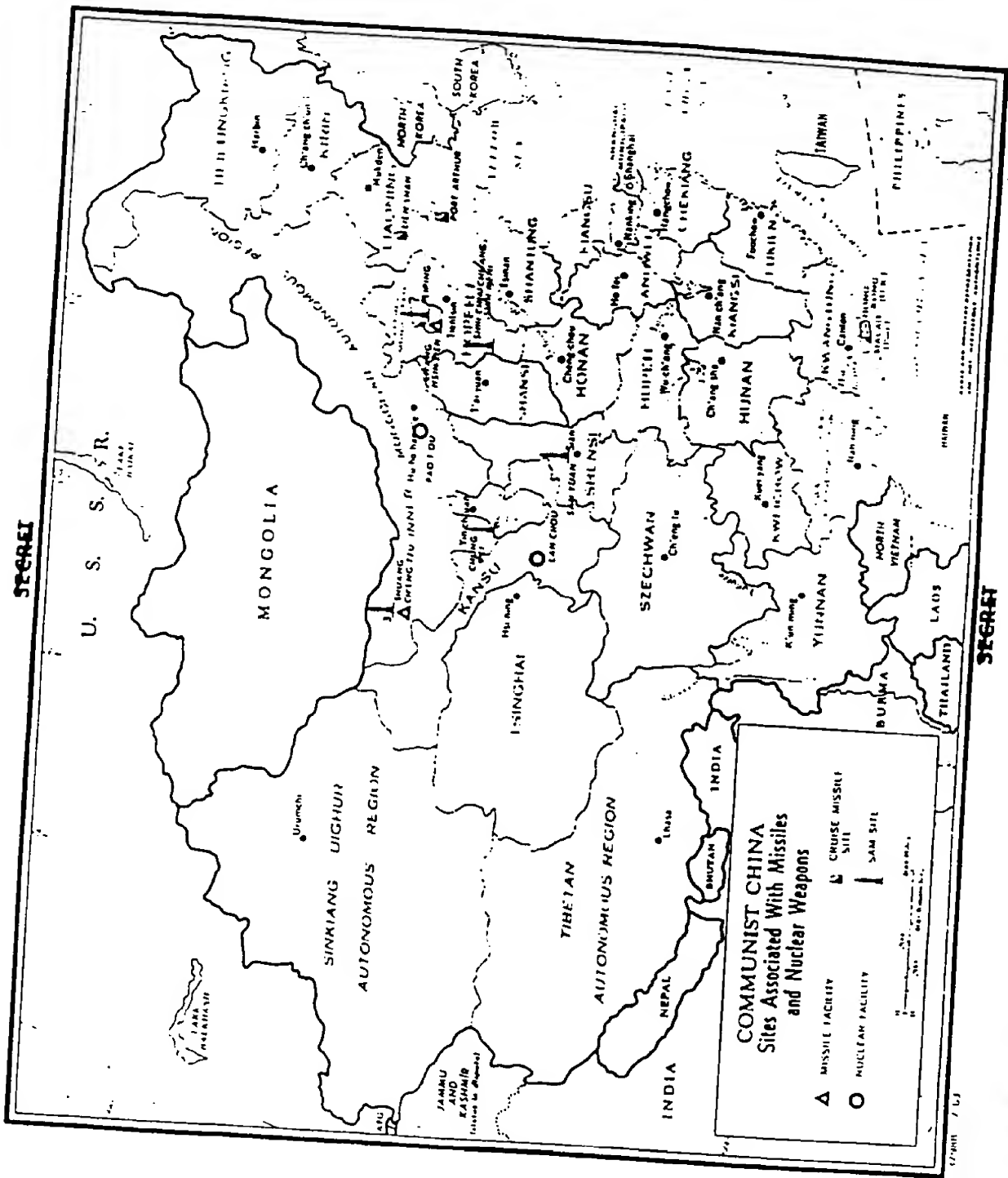
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possession of nuclear weapons would reinforce their efforts to achieve Asian hegemony through political pressures and the indirect support of local "wars of liberation." Such tactics would probably acquire greater effectiveness, since the Chinese feat would have a profound impact on neighboring governments and peoples. It would alter the latter's sense of the relations of power, even if it made little immediate change in the realities of power, and to a greater or lesser degree would probably result in increased pressures to accommodate to Chinese demands.

27. The foregoing assumes that the Communist Chinese leaders will react rationally to their nuclear and missile achievements. On balance we believe that they will. Nevertheless we do not exclude the possibility that Peiping's leadership might overestimate China's capabilities dangerously and embark on radical new external courses.

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